Applicant respectfully requests reconsideration of these rejections.

This application describes processes and compositions embodying principles of the present invention.

Claim 1 relates to a braze alloy consisting of, in wt.-%: 10-15% Cr, 4.5-6% Al, 0.17-0.3% Y, 8-12% Co, 0-4% W, 2.5-5% Ta, 2.0-3.5% B, with Cr+Al > 15%, Cr/Al ≤ 3, and Al+Ta > 7.5 %, remainder Nickel and impurities.

The prior art, including *Budinger*, *Schnell*, *Stern*, *Schaefer*, *Van Esch*, and *Rafferty*, fails to disclose, describe, or fairly suggest the combination of features recited in the pending claims.

New Rejections based on *Budinger*

The Office Action alleges at page 2 that, "Budinger teaches a **braze alloy** that consists essentially of, by weight, 4 to 18.5 % Co, 4.5 to 14 % Cr, 3 to 6.2 % Al , ... as incidental impurities. Claim1" (emphasis added). This is simply not correct, because *Budinger* instead discloses, using the terms of *Budinger*'s Claim 1, "an improved braze material for brazing ... comprising: a **high melt component having at least one metallic powder** consisting essentially of, by weight, 4 to 18.5 % Co, 4.5 to 14 % Cr, 3 to 6.2 % Al ...as incidental impurities, **and a low melt componen**t having at least on metallic powder" consisting of a different composition (emphasis added); thus, *Budinger* describes two distinct materials, not one material as alleged in the Office Action. According to *Budinger,* the high-melt components **remain solid at the effective brazing temperature** (column 4, lines 52-53: "This first group is identified as the high-melting alloys. They remain substantially solid at the effective brazing temperature). The "braze alloy" cited in the Office Action is therefore not a braze alloy, but only a braze alloy constituent (see also *Budinger*, Title of Table I, examples HM1 to HM10). Only one of the described examples (material No. HM7 in Table I) has a composition that does not contain Ti, Mo, Nb, Re, Hf, but in contrast to the Examiner's statement in the Office Action, the composition of that HM7 material (34.7 Cr, 9.7 Ta, 8.5 W, remainder Co) does not overlap the ranges claimed in pending Claim 1. In fact, the composition of HM7 is very much outside the claimed ranges (8-12 Co, 10-15 Cr, 2.5-5 Ta, 0-4 W, 4.5-6 Al, 0.17-0.3 Y, 2-3.5 B, remainder

Ni).

The Examiner's discussion regard boron could not be followed, because Boron is known as a melting suppressant. Importantly, a person of ordinary skill in the art would find no rational reason relating to *Budinger*'s subject matter to add boron to *Budinger*'s high melt component, because to do so would cause an undesired effect: the high melt component is not intended to be melted at brazing temperature. The Office Action opines in the middle of page 3 that,

> a person of ordinary skill in the art at the time of invention would have appreciated that adding boron to the high-melt component of the bulk composition would allow for a bulk composition that has a melting point within a desired range, i.e. within the range used in the low-melt component.

So, the Examiner essentially is of the opinion that a person of ordinary skill in the art would want to lower the melting point of the high melt component down to the temperature of the low melt component of *Budinger*'s two-component system, and thus destroy all of the utility that *Budinger* designed into the system having high- and low-melting point components. That is, the Examiner's position is, simply stated, that a person of ordinary skill in the art would find it rational to entirely destroy *Budinger*'s system for no articulated (in the Office Action) purpose. Applicant, and U.S. patent law, strongly disagrees with the Office Action's characterture of the hypothetical person of ordinary skill in the art, one in which such a person would, without reason, work directly against the goals of the prior art. Instead, a person of ordinary skill in the art would, upon a full and fair reading of *Budinger*'s disclosure, immediately appreciate that, in fact, *Budinger* teaches directly away from the modification alleged in the Office Action to be obvious.

Furthermore, *Budinger* is also silent about the other three features in pending Claim 1: "Cr+Al>15%, Cr/Al ≤3, and Al+Ta>7.5%". There is no disclosure, description, or suggestion in *Budinger* to use those criteria when designing a brazing alloy. The Office Action tacitly acknowledges that *Budinger* fails to disclose, describe, or suggest these features of the claimed combinations, because the Office Action does not even address them. Thus, the Office Action

does not make out a *prima facie* case of obviousness for the additional reason that it has failed to address each and every feature recited in the pending claims.

Assuming, *arguendo*, that a person of ordinary skill in the art would find a rational reason to choose the bulk compositions of the low melt component and the high melt component, it would still not be obvious for a person skilled in the art to arrive at the claimed combinations. The disclosed **bulk composition range** according to claim 1, and column 12, lines 54-67 of *Budinger* consists essentially of, by weight percent, about

3-13.5 Co,
2.8-15 Cr,
3-7.5 Al,
0-5 Ti,
0-2.5 Mo,
2.5-6.9 Ta,
3-8 W,
0-1.5 Nb,
0-6 Re,
0-1.5 Hf,
0-2.2 Si,
0-1 B,
balance Ni and incidental impurities.

When the composition does not contain Ti, Mo, Nb, Re, and Hf, then there is an overlap of the claimed braze alloy composition ranges in the Co, Cr, Al, Ta, and W content, but not with respect to Y (0.17-0.3) and B (2-3.5). In addition, none of the detailed 55 bulk compositions cited by *Budinger* in Table II is in the range of Claim 1.

As already discussed, *Budinger* is also silent about three other features in pending Claim 1: "Cr+Al>15%, Cr/Al $\leq$3, and Al+Ta>7.5%". There is no hint, suggestion, or rational reason in *Budinger*, the remaining prior art, or offered in the Office Action to use these criteria for designing a brazing alloy. Therefore, *Budinger* neither realized the importance and effects of

those three features, nor did *Budinger* disclose Y as an alloying element in the claimed range of the bulk composition. As Applicant described in this application when it was filed, it was an unexpected effect (see page 8, last 3 lines) that, with such a high Y content in the disclosed brazing alloy, such an enhanced high temperature oxidation resistance could be reached. Furthermore, the yttrium content is balanced - among others - with the Cr/Al ratio of the alloy. The Cr/Al ratio maximum 3 in Claim 1, and the Y content, are adaptations to the specific composition.

Rejections based on *Budinger* and *Schnell*

Applicant has, in the papers filed 16 September 2009 (Amendment and Response under 37 C.F.R. § 1.111) and 9 February 2010 (Request for Pre-Appeal Brief Review Conference), responded in detail to the hypothetical combination of the disclosures of *Budinger* and *Schnell*, and will not burden the record further with a redundant discussion; those arguments, being fully applicable to the current rejections, are incorporated by reference for brevity's sake.

Stern*, *Schaefer*, *Van Esch*, and *Rafferty

The tertiary disclosures of *Stern*, *Schaefer*, *Van Esch*, and *Rafferty* fail to cure the fundamental deficiencies of *Budinger*, and *Budinger* in view of *Schnell*, with respect to the combinations of the pending claims, and therefore their further hypothetical combination still would not render the claims unpatentable.

Conclusion

For at least the foregoing reasons, Applicant respectfully submits that the subject matters of Claims 1, 2, and 5-11, each claim taken as a whole, would not have been obvious to one of ordinary skill in the art at the time of Applicant's invention, are therefore not unpatentable under 35 U.S.C. § 103(a), and therefore respectfully requests withdrawal of the rejection thereof under 35 U.S.C. § 103(a).

Conclusion

Applicant respectfully submits that this patent application is in condition for allowance. An early indication of the allowability of this application is therefore respectfully solicited.

If Mr. Mekhlin believes that a telephone conference with the undersigned would expedite passage of this patent application to issue, he is invited to call on the number below.

It is not believed that extensions of time are required, beyond those that may otherwise be provided for in accompanying documents. If, however, additional extensions of time are necessary to prevent abandonment of this application, then such extensions of time are hereby petitioned under 37 C.F.R. § 1.136(a), and the Commissioner is hereby authorized to charge fees necessitated by this paper, and to credit all refunds and overpayments, to our Deposit Account 50-2821.

Respectfully submitted,

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